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(71) Applicant (for all designated States except US): CIBA  
SPECIALTY CHEMICALS WATER TREATMENTS  
LIMITED [GB/GB]; Cleckheaton Road, Low Moor, Brad-  
ford, West Yorkshire BD12 0JZ (GB).

(72) Inventor; and

(75) Inventor/Applicant (for US only): HUGHES, Jonathan  
[GB/GB]; 6 Lightridge Road, Fixby, Huddersfield, West  
Yorkshire HD2 2HE (GB).

(74) Common Representative: CIBA SPECIALTY CHEM-  
ICALS WATER TREATMENTS LIMITED; Cleck-  
heaton Road, Low Moor, Bradford, West Yorkshire BD12  
0JZ (GB).

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(54) Title: PRODUCTION OF A FERMENTATION PRODUCT

(57) **Abstract:** A process of producing fermentation product comprising the steps of, (i) forming an acidified suspension of particulate plant derived material comprising a first polysaccharide which is more readily hydrolysable and a second polysaccharide which is more difficult to hydrolyse, (ii) allowing the first polysaccharide to undergo hydrolysis by action of the acid at a temperature of at least 50°C under conditions such that the first polysaccharide is hydrolysed and thereby forming a mixture of an aqueous liquor containing dissolved sugar and a solid residue containing the second polysaccharide, (iii) subjecting the mixture to one or more separation stages in which the solid residue and aqueous sugar liquor are substantially separated from each other, (iv) optionally washing the residue substantially free of the acid and the sugar, (v) passing the solid cellulosic residue to a further treatment stage in which the residue is subjected to the action of dilute acid at a temperature of at least 50°C under conditions such that the second polysaccharide is hydrolysed and thereby forming a mixture of an aqueous liquor containing dissolved sugar and a solid residue, (vi) subjecting the mixture to one or more separation stages in which the solid residue and aqueous sugar liquor are substantially separated from each other, (vii) optionally washing the residue substantially free of the sugar, (viii) adjusting the pH of the aqueous liquor from stages (iii), (iv), (vi) and (vii) to a pH of at least 4, (ix) passing the aqueous liquor from stage (viii) to a fermentation stage in order to produce a fermentation product, (x) separating the fermentation product from the broth, wherein the separation stage in steps (iii) and/or (vi) is assisted by flocculation of the waste by-product, employing one or more flocculating agent(s) which are water soluble or swellable polymers or charged microparticulate material. Typically such fermentation products include for instance ethanol, glycerol, acetone, n-butanol, butanediol, isopropanol, butyric acid, methane, citric acid, fumaric acid, lactic acid, propionic acid, succinic acid, itaconic acid, acetic acid, acetaldehyde, 3-hydroxypropionic acid, glyconic acid, tartaric acid and amino acids such as L-glutaric acid, L-lysine, L-aspartic acid, L-tryptophan, L-arylglycines or salts of any of these acids.

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